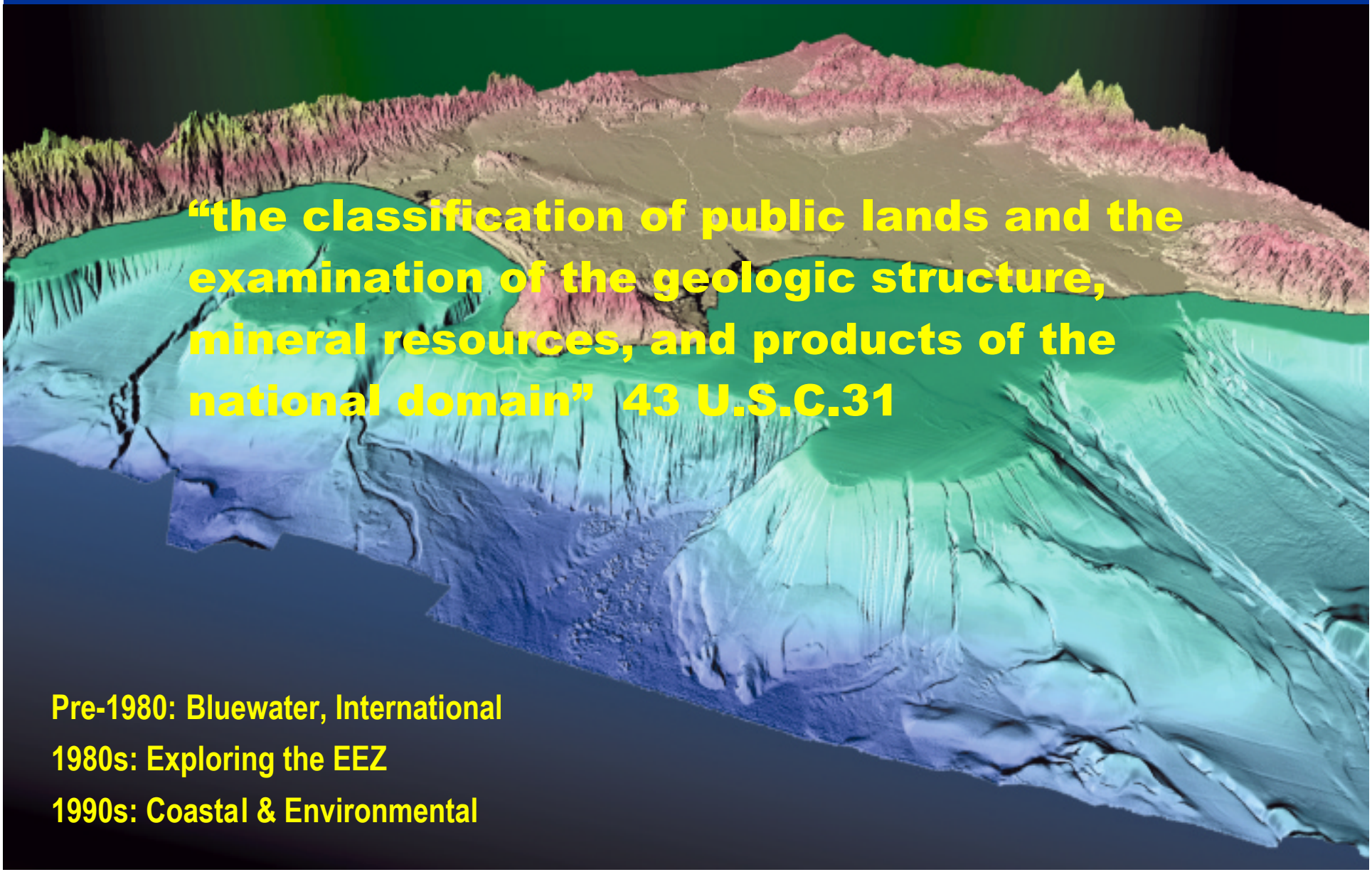
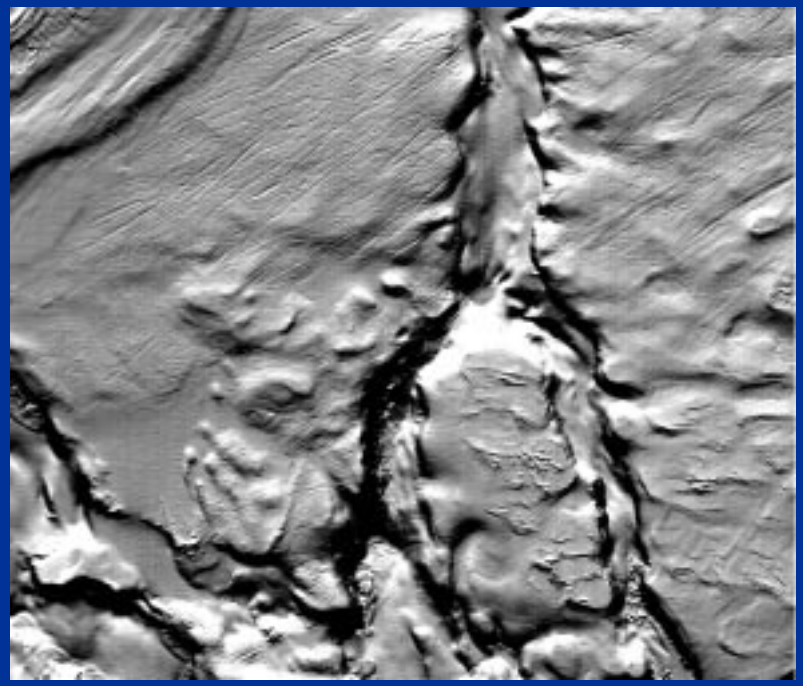
USGS
science for a changing world





Stellwagen Bank Topography

HAZARDS: Earthquakes, Tsunami, Landslides
Storms, sea-level rise, erosion

ENVIRONMENT: Benthic Habitats, Corals, Wetlands
Pollution, Sanctuaries & MPAs

RESOURCES: Energy, Hydrates, Minerals, Water

ALL require a regional *description* and *understanding* of geologic framework and processes

USGS

Scientific mapping and characterization of the sea floor is fundamental to ocean exploration

The USGS has mapped the deep parts of the US EEZ using GLORIA systems

New swath and LIDAR technology is now available to map from the shoreline to the shelf edge in the EEZ

These maps will provide new insights and a framework critical for research and wise management of America's ocean resources.

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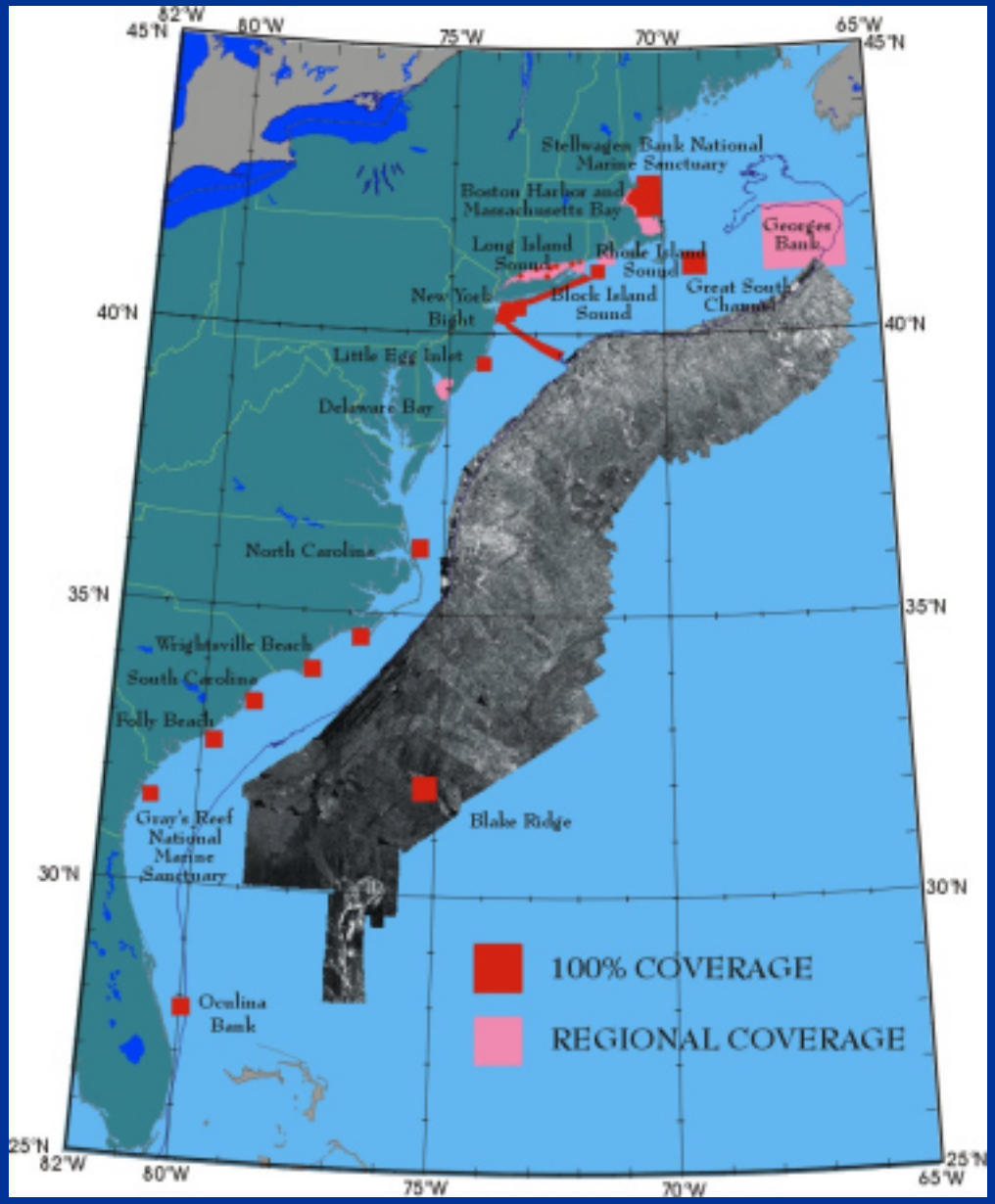
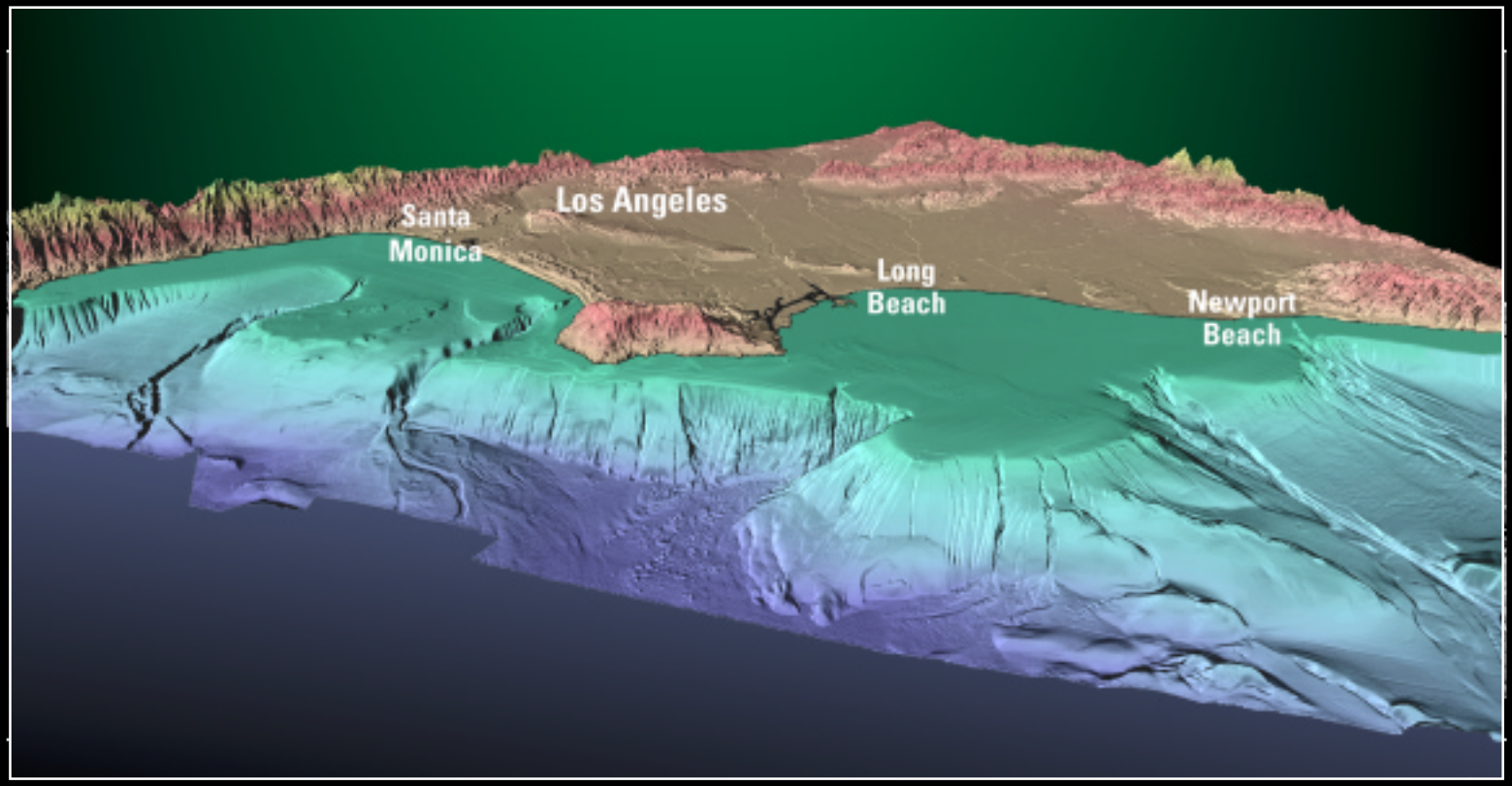


oblique view of LA margin

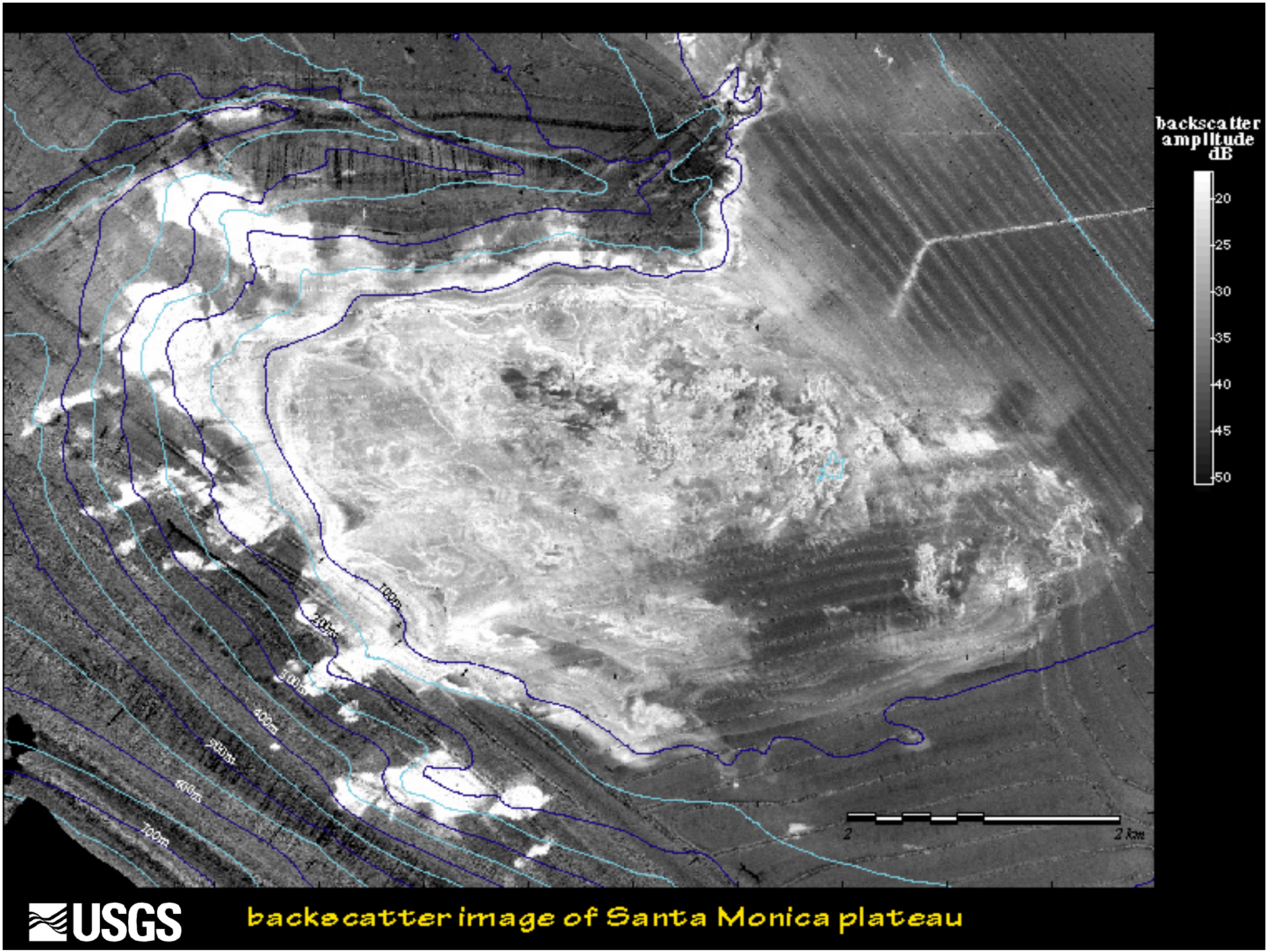
(20 to 800 M)

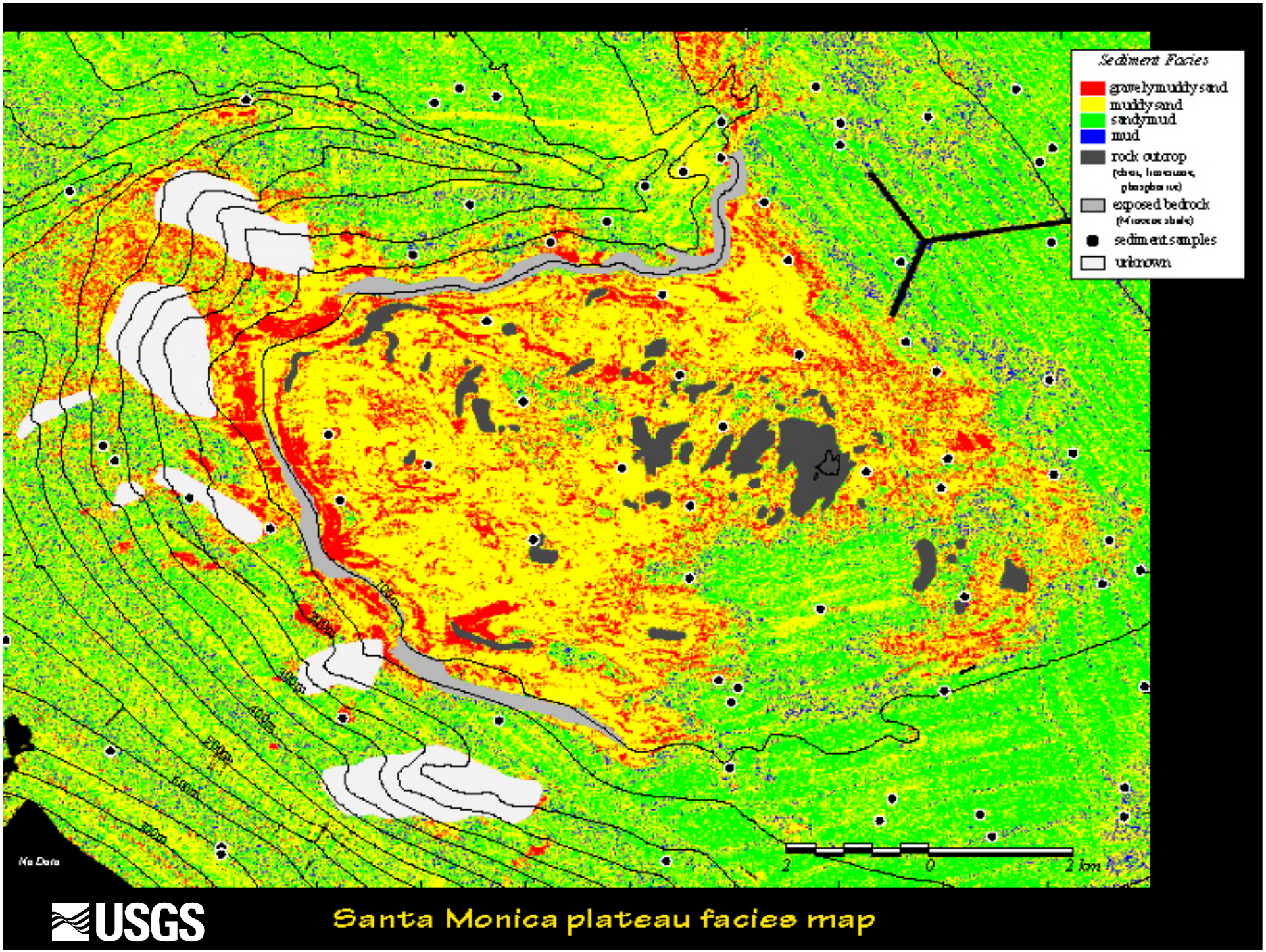
3 different multibeams, three different years

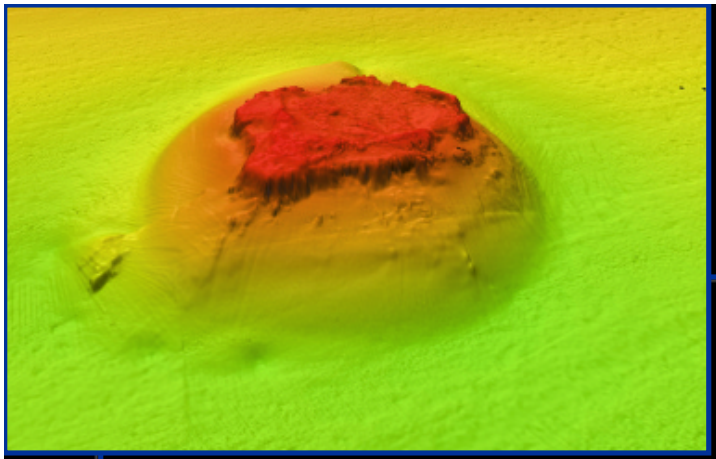


- systematic surveys
- compatable state-of-the-art technologies
- georeferenced databases
- onshore to offshore

USGS


backscatter amplitude dB
20
25
30
35
40
45
50
100m
200m
300m
400m
500m
700m
2
2 km
USGS
backscatter image of Santa Monica plateau


Sediment Facies
gravelymuddysand
muddysand
sandymud
mud
rock outcrop
(chert, limestone, phosphorite)
exposed bedrock
(Miocene shale)
sediment samples
unknown
100m
200m
300m
400m
500m
600m
No Data
2
0
2 km
N
USGS
Santa Monica plateau facies map



newly discovered salt-dome reef

Far Tortuga Reef

Triple Top Reef

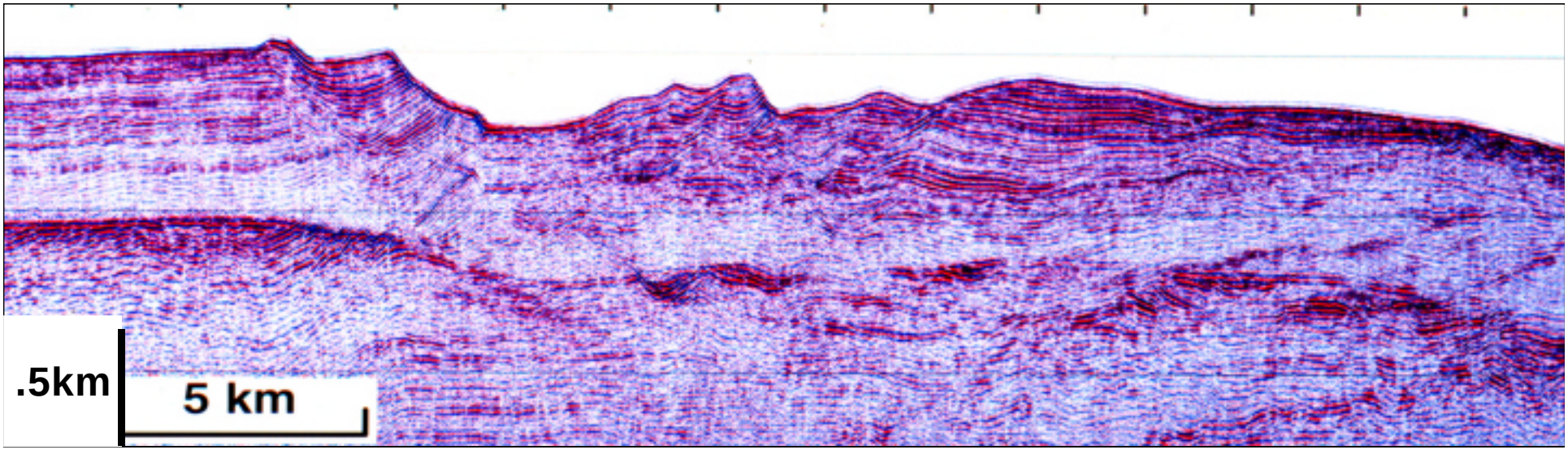
Rough tongue Reef

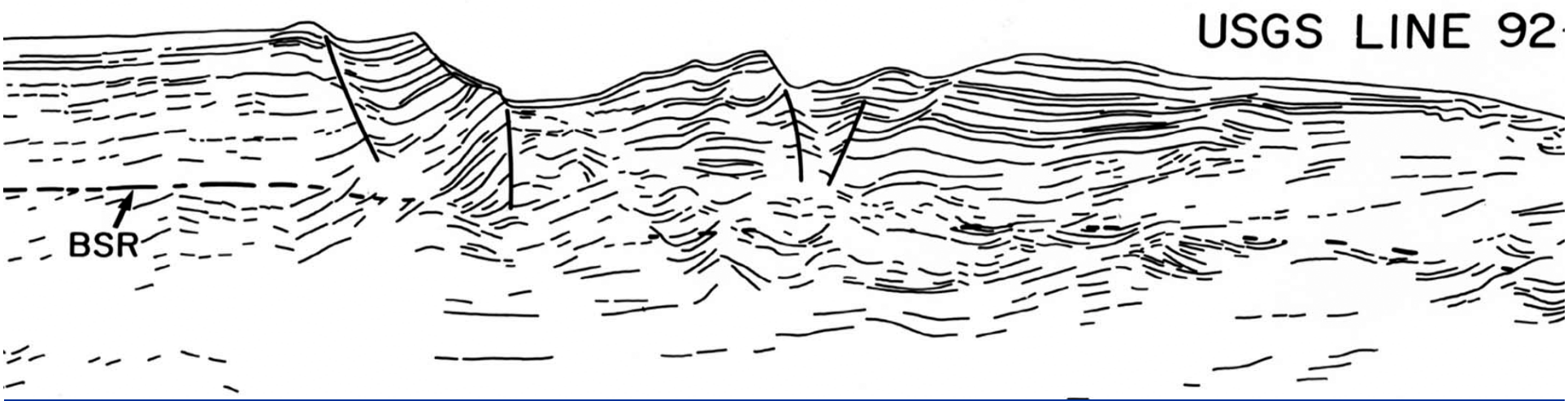
Ludwick & Walton Pinnacle Reef

Alabama Alps Reef

GOM Pinnacles area of Deep-water reefs (5/2000)

USGS

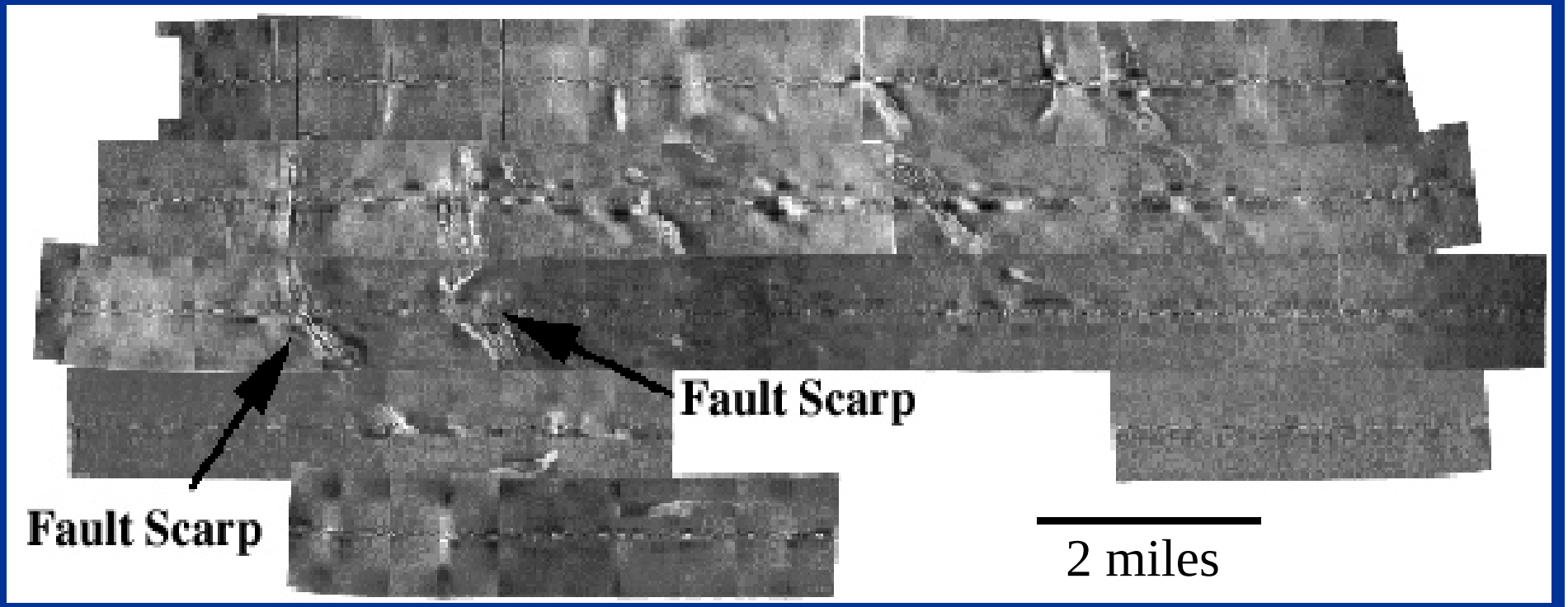




Seismic profiles show major collapse of the Blake Ridge crest related to gas hydrate processes (water depth ~2700 m)

Issue: Gas hydrate influence on seafloor stability and drilling safety

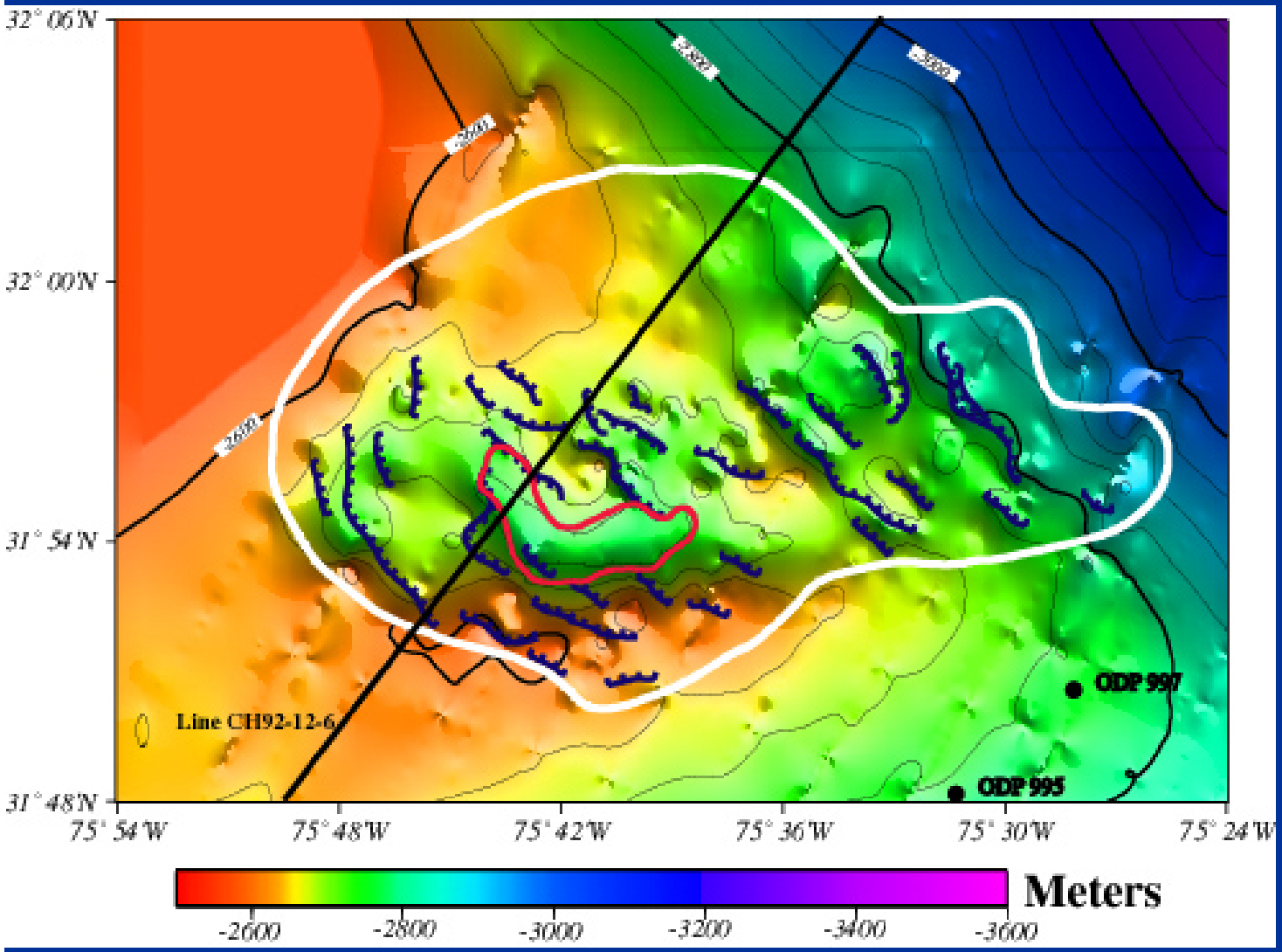
USGS



Deep-towed sidescan imaging

defines fault pattern

USGS



Mapping discloses a volume loss of greater than 13 km^3 estimated to have contained ~4% of the present atmospheric methane volume.

Issue: Gas hydrate influence on climate

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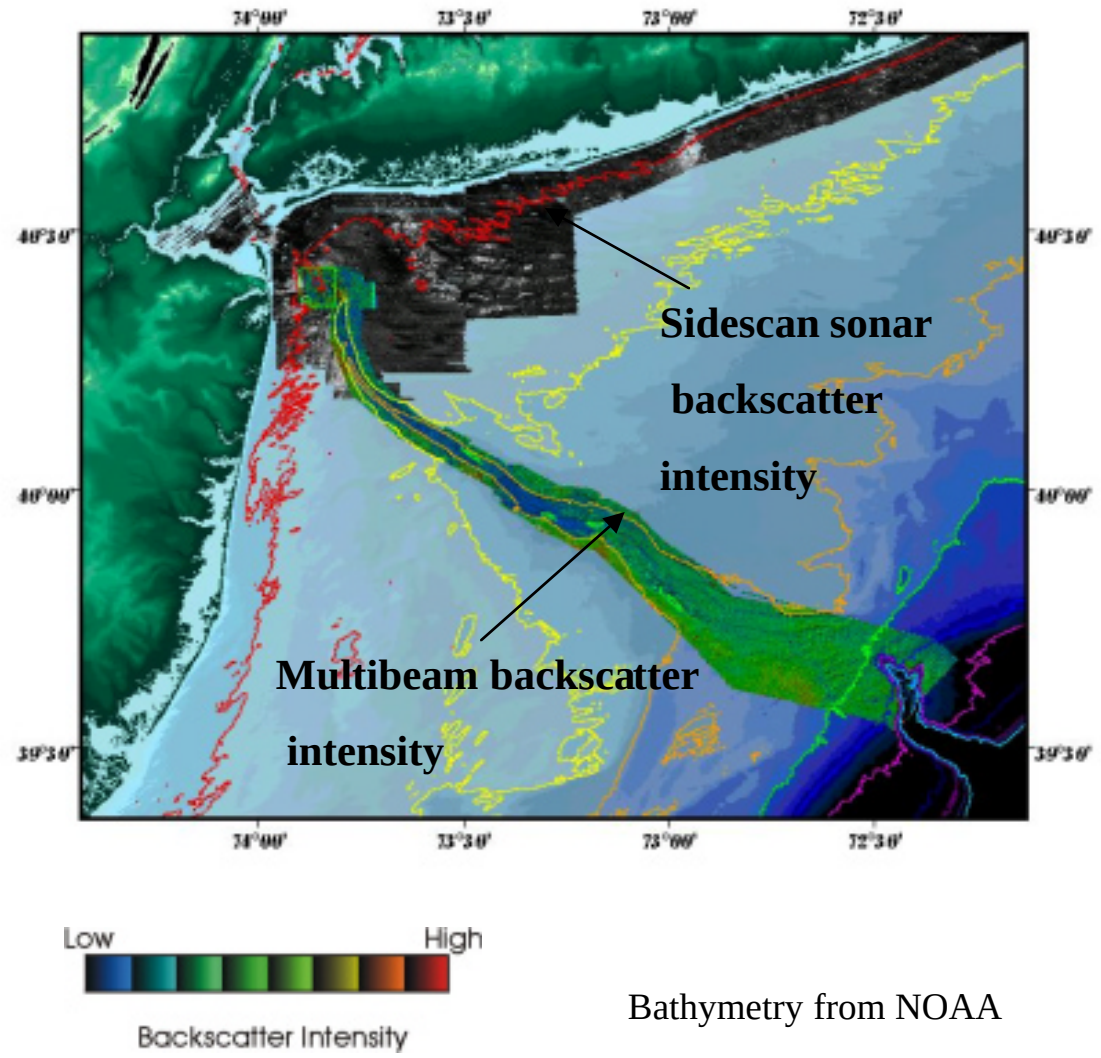
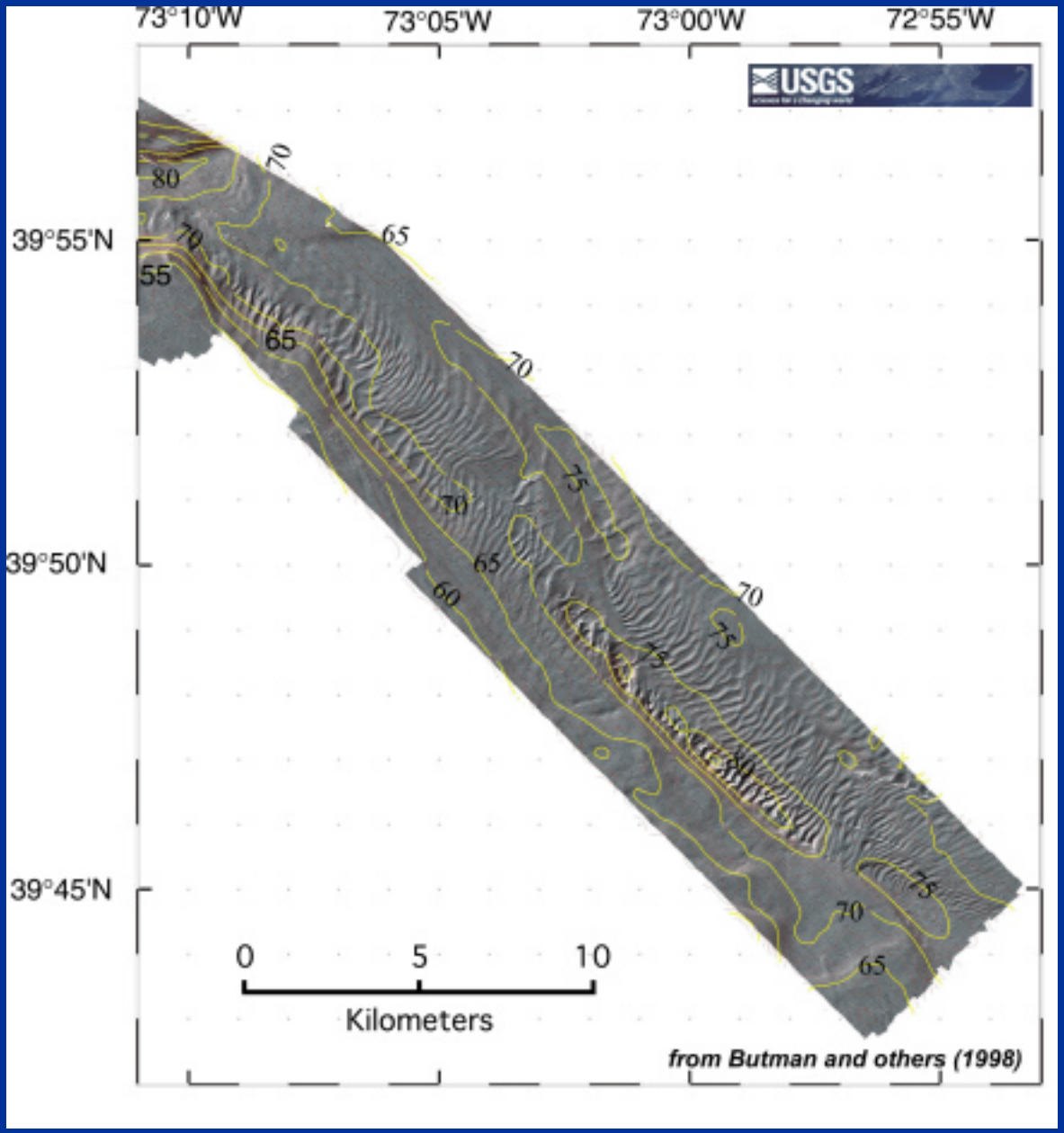
Scientific mapping of the seafloor offshore of New York is providing a critical framework for pollution, resource and habitat studies as well as new insights into climate and the geologic history of the region.



Bathymetry from NOAA

USGS

Shaded relief image of multibeam echo sounder data showing a field of bedforms discovered in the lower Hudson Shelf Valley, thought to be the formed by the catastrophic drainage of a glacial lake that occured ~12,000 years ago.



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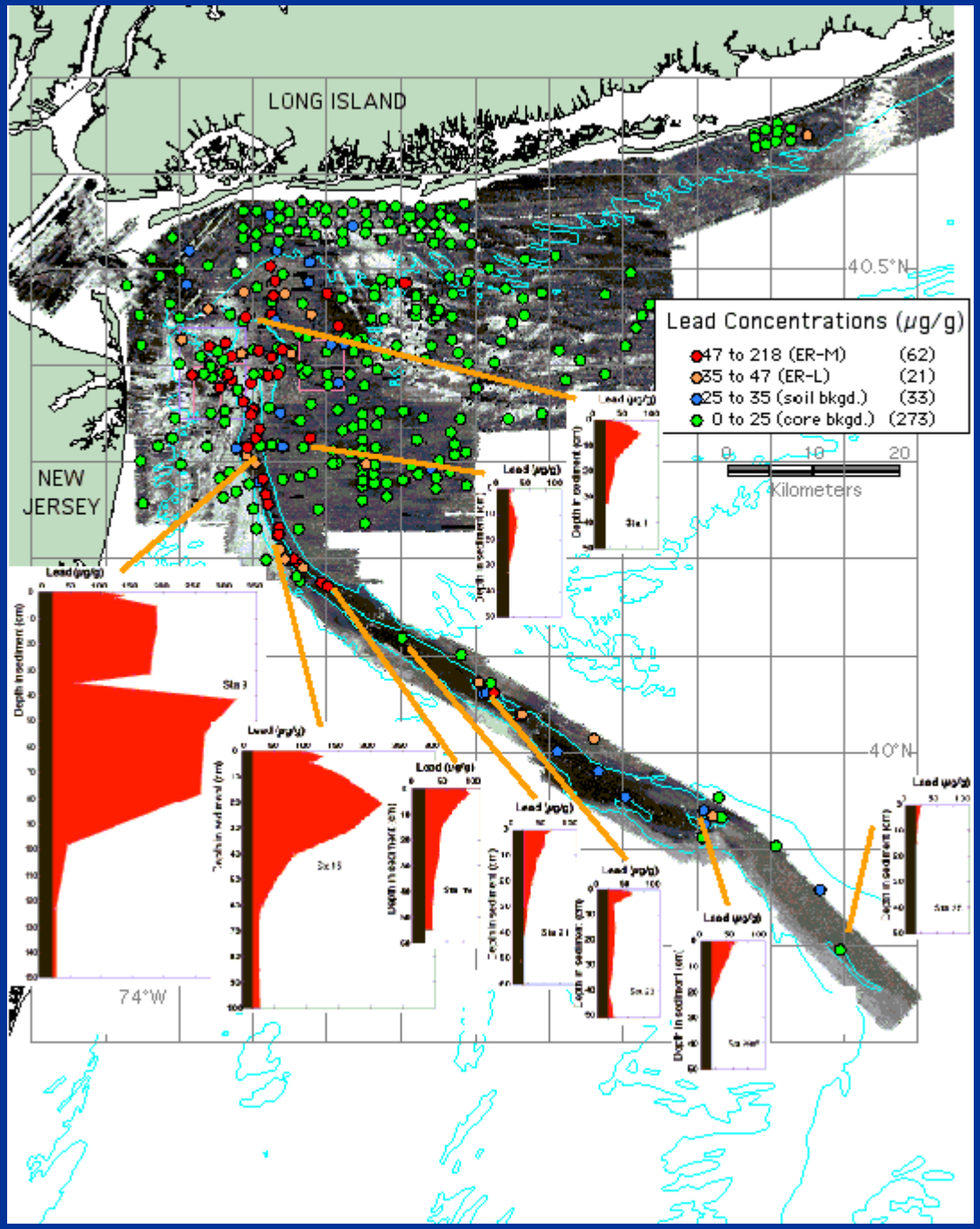
Contaminants from disposal of sewage sludge and from dredged material offshore of New York have accumulated in the upper portion of the Hudson Shelf Valley. Traces are found as far as 100 km down valley.



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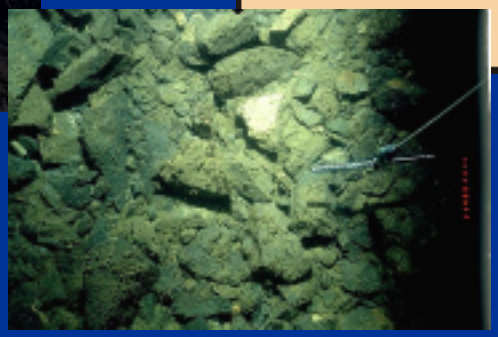
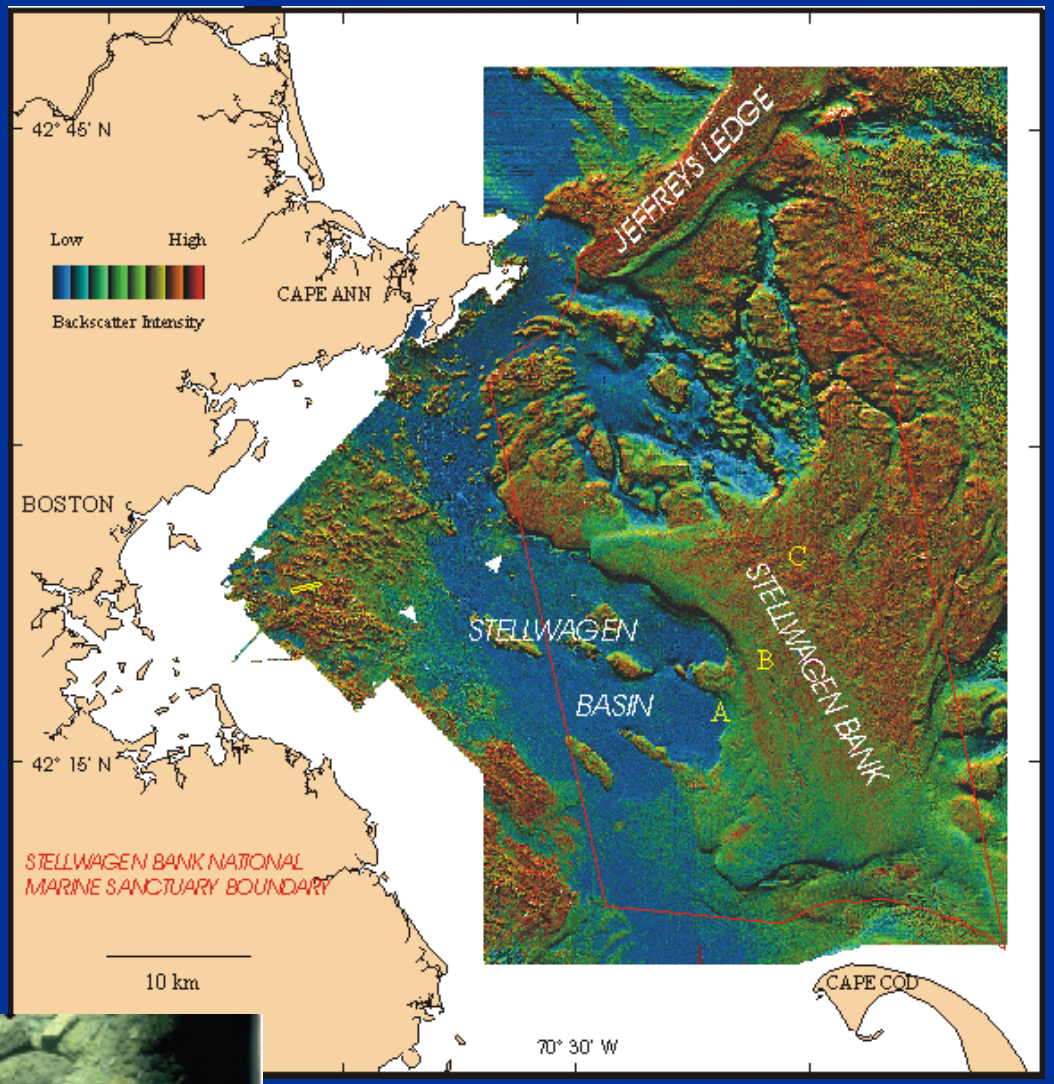
The seafloor environment in Massachusetts Bay varies from mud in the depositional basins to coarse sand, gravel and bedrock on the topographic highs.





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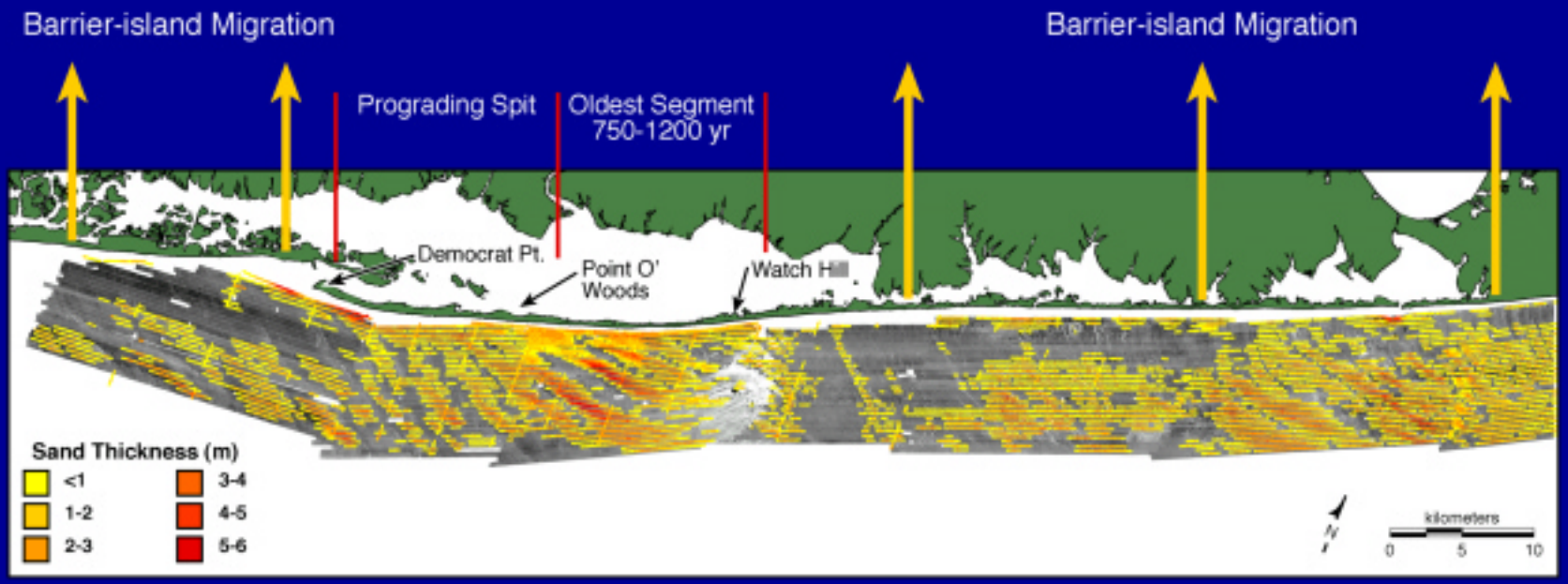

Exploration of the inner shelf using modern mapping techniques (sidescan, bathymetry, seismics) have revealed a direct relation between the shallow geologic framework and coastal evolution/behavior. Off Long Island, New York, the rate of landward migration of the barrier-island system is clearly linked to the amount of sediment available on the inner shelf.

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